

Title:

NASA/NOAA: Earth Science Electronic Theater '999

Earth Science Observations, Analysis and Visualization:  
Roots in the 60s -Vision for the Next Millennium.

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Abstract:

The Etheater presents visualizations which span the period from the original Suomi/Hasler animations of the first ATS-1 GEO weather satellite images in 1966..... to the latest 1999 NASA Earth Science Vision for the next 25 years. Hot off the SGI-Onyx Graphics-Supercomputer are NASA's visualizations of Hurricanes Mitch, Georges, Fran and Linda. These storms have been recently featured on the covers of National Geographic, Time, Newsweek and Popular Science. Highlights will be shown from the NASA hurricane visualization resource video tape that has been used repeatedly this season on National and International network TV. Results will be presented from a new paper on automatic wind measurements in Hurricane Luis from 1-min GOES images that appeared in the November BAMS.

The visualizations are produced by the NASA Goddard Visualization & Analysis Laboratory (VAL/912), and Scientific Visualization Studio (SVS/930), as well as other Goddard and NASA groups using NASA, NOAA, ESA, and NASDA Earth science datasets.

Visualizations will be shown from the Earth Science ETheater '999 recently presented in Tokyo, Paris, Munich, Sydney, Melbourne, Honolulu, Washington, New York, and Dallas. The presentation Jan 11-14 at the AMS meeting in Dallas used a 4-CPU SGI/CRAY Onyx Infinite Reality Super Graphics Workstation with 8 GB RAM and a Terabyte Disk at 3840 X 1024 resolution with triple synchronized BarcoReality 9200 projectors on a 60ft wide screen. Visualizations will also be featured from the new Earth Today Exhibit which was opened by Vice President Gore on July 2, 1998 at the Smithsonian Air & Space Museum in Washington, as well as those presented for possible use at the American Museum of Natural History (NYC), Disney EPCOT, and other venues.

New methods are demonstrated for visualizing, interpreting, comparing, organizing and analyzing immense HyperImage remote sensing datasets and three dimensional numerical model results. We call the data from many new Earth sensing satellites, HyperImage datasets, because they have such high resolution in the spectral, temporal, spatial, and dynamic range domains. The traditional numerical spreadsheet paradigm has been extended to develop a scientific visualization approach for processing HyperImage datasets and 3D model results interactively. The advantages of extending the powerful spreadsheet style of computation to

multiple sets of images and organizing image processing were demonstrated using the Distributed Image SpreadSheet (DISS). The DISS is being used as a high performance testbed Next Generation Internet (NGI) VisAnalysis of: 1) El Nino SSTs and NDVI response 2) Latest GOES 10 5-min rapid Scans of 26 day 5000 frame movie of March & April '98 weather and tornadic storms 3) TRMM rainfall and lightning 4) GOES 9 satellite images/winds and NOAA aircraft radar of hurricane Luis, 5) lightning detector data merged with GOES image sequences, 6) Japanese GMS, TRMM, & ADEOS data 7) Chinese FY2 data 8) Meteosat & ERS/ATSR data 9) synchronized manipulation of multiple 3D numerical model views; etc. will be illustrated. The Image SpreadSheet has been highly successful in producing Earth science visualizations for public outreach. Many of these visualizations have been widely disseminated through the world wide web pages of the HPCC/LTP/RSD program which can be found at <http://rsd.gsfc.nasa.gov/rsd> The one min interval animations of Hurricane Luis used by Peter Jennings on ABC Nightline and the color perspective rendering of Hurricane Fran published by TIME, LIFE, Newsweek, Popular Science, National Geographic, Scientific American, and the "Weekly Reader" are some of the examples which will be shown.

The presentation will be given using a SGI Octane with 2 CPUs, 2GB RAM, 54GB Disk, . and an Apple Macintosh G3/292 PowerBook using two high-end video projectors on a 12' X 36' screen. It will feature multimedia visualization tools such as QuickTime movies, QTVR, and VRML.